REMARKS

Summarizing the status of the claims pursuant to this Amendment, claims 1 - 19 are pending in the application; claims 13-15, 18 and 19 are withdrawn from consideration, claims 1, 4-8, 11, 12, and 16 are currently amended; claims 2, 3, 9, 10 and 17 are unchanged from the original version of the claims; and claims 20 - 28 are added. Accordingly, Applicant submits that claims 1-12, 16, 17, as amended, and newly added claims 20-28 are directed to patentable subject matter, and are believed to be in condition for allowance. Reconsideration of the application, withdrawal of the Rejections, and issuance of a Notice of Allowability with respect to claims 1-12, 16, 17, and 20-28 are respectfully requested.

More specifically, the Examiner has rejected claims 1-8 and 16 under 35 USC §102(b) as being anticipated by or, in the alternative, under 35 USC §103(a) as being obvious over Van Gils (4,522,036). The Van Gils patent discloses a cooling device including an evaporator, compressor, condenser and air displacing member for generating a cooling air stream over the condenser. An electrical switching system is provided to invert the air stream away from the condenser that includes an electric motor 10 having its polarity changed by an electric switch 11 controlled by a cycle generator 12. The switching cycle is fixed (e.g., 6 hours forward, 15 minutes reverse). In a refrigerating system, the cycle generator operates independently of the compressor

and inverts the blower each time the compressor is turned off during a thawing cycle to blow the condenser clean (see, col. 2, ll, 51-60; col. 3, ll. 1- 21; claim 1).

This is in direct contrast to the cleaning system of the present invention. In the present invention as set forth in independent claim 1, as amended, the control means drives the fan motor during the refrigeration cooling cycle during operation of the compressor. The fan is driven in forward and reverse directions when power is supplied to the compressor during the refrigeration cooling cycle. Clearly, this claimed invention is diametrically opposed to the teachings of the Van Gils patent. In Van Gils, the reverse air flow is provided when the compressor is deenergized during thawing cycles. In fact, the Van Gils patent actually teaches away from the present invention by teaching that it is preferred to operating the fan in reverse for condenser cleaning when the compressor is deenergized. Amended claim 1 clearly requires the fan operates in forward and reverse during the refrigeration cooling cycle when the compressor is energized.

Moreover, the claimed invention sets forth that the first and second time periods are tolled when power is not supplied to the cleaning system. The present invention clearly provides improved energy efficiency by providing a fan that cools the condenser in forward and reverse modes and cleans the condenser during refrigeration cooling cycles. The fan motor drive system is off during the compressor off cycle, allowing for

improved energy efficiency when compared to Van Gils in which the condenser fan motor operates when the compressor is off.

Additionally, the Van Gils invention states the compressor to be turned off periodically (e.g., every 6 hours) to allow for the fan to reverse operation for a cleaning cycle (e.g., 15 minutes). Such an arrangement is inefficient, especially during situations such as long temperature pull downs when Van Gils would require the compressor to be turned off at set intervals to reverse the condenser fan motor. The Van Gils system adds to the time required to run a temperature pull down test such as those required during beverage bottler IPD testing. For example, during a 12 hour testing period, the compressor in Van Gils would have to be turned off at least twice under the preferred time interval for fan operation set forth in Van Gils. The present invention eliminates the need for compressor down time by providing that the fan operates in forward and reverse directions during compressor on time, allowing for quicker temperature pull down and improved IPD test performance.

Furthermore, the control means set forth in claim 1 is simpler and improved when compared to the system set forth in Van Gils. Since the reversing function of the fan motor drive of the present invention occurs during the refrigerator cooling cycle when the compressor is operating, the compressor, control means and motor drive system are all powered simultaneously. In the Van Gils design, the fan motor is powered in reverse by an additional set of contacts (the cycle generator) during the compressor off

cycle. This additional set of contacts is a detriment on the design of the Van Gils system and complicates the design.

Moreover, Van Gils teaches it is advantageous to supply constant power to the cycle generator during the cool/clean cycle. However, supplying constant power to the cycle generator and having a fixed duty cycle regardless of operation of the compressor does not allow for differences in the operating environment (e.g., temperature, contaminant level, humidity, etc.) to be accounted for in the cleaning system. The present invention as set forth in claim 1 provides that the cleaning means runs the fan only during the refrigeration cycle during the normal operating mode of the compressor. Such an arrangement clearly is not taught by the Van Gils reference.

In view of the foregoing, Applicant believes amended claim 1 is patentable over the Van Gils reference, and withdrawal of this rejection is respectfully requested.

Claims 2-12 depend from and further define claim 1, and are believed to be allowable therewith. More specifically, with respect to claim 2, the Examiner notes that Van Gils states it is preferred to use a higher rotor speed in the reverse (cleaning) mode than in the forward (cooling) mode. However, Van Gils does not teach or disclose any control means for changing the speed of the rotor in forward and reverse. To the contrary, the circuit diagram in the Van Gils patent sets forth a polarity commutating motor such as a fixed speed RPSC induction motor. No speed control circuitry is taught or disclosed. Accordingly, Applicant submits that Van Gils fails to teach control means

as provided in claim 1 that allows for varying speed in forward and reverse as required in claim 2. Thus, claim 2 is believed to be allowable for this reason as well as those set forth above with respect to claim1.

With respect to claim 3, Examiner notes that Van Gils teaches a forward running time, by example, of 6 hours and a reverse running time of 15 minutes. However, the time intervals differ from the time periods set forth in claims 1 and 3 in that the Van Gils time intervals are fixed and based upon 'real' elapsed time such that after every 6 hours of elapsed time, the cycle generator cuts off power to the compressor and reverses direction of the fan for 15 minutes during the cleaning cycle. Such a system is in sharp contrast to the present invention of claims 1 and 3 in that the control means runs the fan in reverse direction only during the refrigeration cooling cycle when the compressor is in normal operating mode. Moreover, the first (forward) and second (reverse) time intervals are tolled when power is not supplied to the cleaning system. Thus, the first and second time periods of the present invention are based upon compressor running time, not real elapsed time as required in Van Gils. Accordingly, claim 3 is allowable for this reason as well.

With respect to claim 4, Van Gils does not teach or suggest running the fan in reverse during the refrigeration cooling cycle. As discussed above, Van Gils actually teaches away from the claimed invention by requiring the reverse cycle operates when the compressor is deenergized. Thus, claim 4 is allowable for this reason as well.

In claim 5, the first speed is about 1500 rpm and the first time period is about 8 hours and the second speed is about 2000 rpm and the second time period of about 14 minutes. As stated above regarding claim 2, Van Gils does not specify specific speeds of operation and provides no enabling disclosure as to providing a higher rotor speed in reverse mode than in forward mode. Additionally, the noted times of 6 hours of forward run time and 15 minutes of reverse run time in Van Gils is based upon 'real' elapsed time, not compressor run time as required for the time intervals set forth in the claimed invention.

In rejecting claim 5, the Examiner lists variables that may impact performance of a condenser cleaning system, such as "pitch of fan blades, distance of fan from heat exchanger, fin density of heat exchanger, etc." However, the present invention overcomes obstacles presented by such variables to provide acceptable cleaning results when the fan operates in forward and reverse modes for the claimed time periods and speeds. The present invention provides improved flexibility by allowing for installation in a variety of operating environments, regardless of these variables. Such time intervals and speeds as required in claim 5 are not taught or suggested by Van Gils.

Moreover, the first and second speeds of 1500 rpm and 2000 rpm, respectively, are not taught or suggested by Van Gils. Van Gils actually teaches away from this limitation by providing a fixed speed RPSC motor in which speed changes are not

possible in forward and reverse operation. In stepping up the reverse speed from 1500 rpm to 2000 rpm, the air flow kinetic energy is approximately doubled. This energy is employed both to cool the condenser and to dislodge debris. This consideration does not appear in Van Gils or in any other reference cited by the Examiner. Accordingly, claim 5 is allowable for these reasons as well.

Turning now to claim 16, Examiner asserts that "it would have been obvious to have offered a bag of parts to effect conversion of the prior art True refrigerator to have a reverse air condenser cleaning system as taught by Van Gils." Applicant disputes this contention. Nowhere in Van Gils is it taught or suggested that an existing refrigerator unit can be retrofitted with the cooling device as set forth in Van Gils. Assuming, for the sake of argument, that such a retrofit kit could be provided based upon the Van Gils cleaning system, such a system would be very complicated and difficult to install. In contrast, the retrofit system of the claimed invention allows for simple installation, requiring no extra pawls, solenoids or relays that would complicate field installation. The wiring of the field kit of the present invention is from the compressor terminals forward, and not as complicated as the Van Gils design would be. Likewise, the R-12/R-134A retrofit kits cited by the Examiner do not provide for an improved cleaning system as required in claim 16. In fact, the R-134A air conditioning is less efficient in both cooling capability and power utilization. Moreover, the retrofit kit of the present invention does not require complex installation procedures, as required in prior art

systems. Thus, claim 16 is believed to be allowable over Van Gils and prior art kits such as R-12/R-134A retrofit kits.

Furthermore, Van Gils does not teach or suggest providing a replacement fan motor, control means for running the replacement motor during a refrigeration cooling cycle at a first speed for a first time period and in a reverse direction at a second speed for a second time period, or a timer for monitoring and accumulating data representative of compressor running time during the refrigeration cooling cycle. As discussed above with respect to claim 1, reverse air flow in Van Gils is provided when the compressor is deenergized during thawing cycles. In fact, the Van Gils patent actually teaches away from the present invention by teaching that it is preferred to operate the fan in reverse for condenser cleaning when the compressor is deenergized. Amended claim 16 clearly requires the fan operates in forward and reverse during the refrigeration cooling cycle. Claim 16 also provides that the control means includes a timer connected to the compressor for monitoring and accumulating data representative of compressor running time during the refrigeration cooling cycle. Such an arrangement clearly is not taught or suggested by Van Gils. Accordingly, claim 16, as amended is allowable for these reasons as well.

Claim 17 depends from and further defines claim 16, and is believed to be allowable for the reasons set forth with respect to claim 16. Moreover, claim 17 requires the reversible replacement motor is a solid state commutated motor. Such a motor is

not taught or suggested by Van Gils. Van Gils discloses a fixed speed ac induction motor. Therefore, claim 17 is allowable for this reason as well.

Claims 6-8 are rejected under 35 USC § 103(a) as being unpatentable over the prior art as applied to claim 1, and further in view of JP'366 or JP'238 of JP'768 or Buchanan or Shell. Note that an incomplete translation of JP '366 was provided by the USPTO. A complete translation has been obtained and a copy is attached for the convenience of the Examiner.

The Examiner states these references teach "it would have been obvious to modify Van Gils, if it doesn't already possess this feature inherently, with a timer that was actuated to measure compressor running time by connecting it across the compressor contactors, for the purpose of reducing the number of superfluous reversals if the timer was simply run at all times."

First, Van Gils does not 'inherently' teach or suggest providing a timer to measure compressor running time by connecting it across compressor contactors to reduce the number of reversals if the timer was run at all times. The time intervals provided in Van Gils are independent of compressor run time, but instead based on 'real' time. No teachings or suggestions in Van Gils have been cited that support the modifications taught by the present invention. Absent such teachings in the prior art, it is not appropriate to apply hindsight analysis to suggest such improvements are now obvious in view of Applicant's invention. In other words, it is necessary to step

backward in time to consider the knowledge of one of ordinary skill in the art when the present invention was unknown and just before it was made. Knowledge of applicant's disclosure must not be considered. However, in the present case it appears that the Examiner has impermissibly used the Applicant's teachings in a hindsight analysis as the basis for asserting the present invention would have been obvious to one of ordinary skill in the art at the time the invention was made. Accordingly, Applicant disagrees with the Examiner's suggestion that Van Gils inherently teaches providing a timer to measure compressor run time.

Turning now to the other references cited by the Examiner in rejecting claims 6-8. In JP'366, a CPU 9 detects whether the compressor 3 has current flow or not based upon the output of a current flow sensor 11. Timer 7 totals the current flow time of the cooling fan. The cooling fan operates in reverse rotation for a set amount of time each time the accumulated rotational time in the forward direction reaches a specified time value. This differs from the present invention, wherein the fan does not operate in reverse mode for a fixed real time interval, but instead operates only when the compressor is energized and for a time period based upon the duration of compressor running time. More specifically, claim 7 requires that the control means includes a timer for monitoring and accumulating data representative of compressor running time during the refrigeration cooling cycle, the timer causing the motor drive system to drive the fan in the forward or reverse direction based upon the duration of compressor running time.

The fan of JP'366 operates in reverse for a set time, regardless of compressor operation (see Diagram 8). Claim 8 further requires the first selected speed is about 1500 rpm and the second selected speed is about 2000 rpm, and that the timer causes the motor drive system to run in the reverse direction for about 14 minutes after every 8 hours of compressor running time. JP'366 employs a fixed speed induction motor (e.g., RPSC induction motor) in which speed changes between the forward and reverse directions are not possible. As discussed above, providing a cleaning system that allows for stepping up the reverse speed from 1500 rpm to 2000 rpm allows for the air flow kinetic energy to be approximately doubled. This energy is employed both to cool the condenser and to dislodge debris. This consideration does not appear in JP'366, Van Gils or in any other reference cited by the Examiner. JP'366 actually teaches away from this limitation. Additionally, JP'366 does not specify a time interval for forward fan operation, and specifies, by example, a reverse time setting of 5 minutes. However, as set forth above, the reverse time interval in JP'366 is based upon real elapsed time, not compressor running time, as required in claim 8. Accordingly, JP'366 fails to teach or disclose the cleaning system as set forth in claims 6-8.

JP'238 is cited by the Examiner at paragraphs [0002]-[0003] for its disclosure regarding JP'366. However, as discussed above, JP'366 fails to teach or suggest the claimed invention. Likewise, the teachings of JP'238 regarding a cooling system for a condenser in a vending machine having control means including a temperature sensor

that monitors the temperature of the condenser to determine when to run the fan in reverse/cleaning mode. Clearly, such a system does not teach or suggest the present invention. Accordingly, claims 6-8 are believed to be patentable over JP'238 as well.

JP'768 discloses control means for cooling fan reversal to blow seawater or rainwater accumulated below surface of air-cooled condenser. As stated in the summary, the control means is provided to control the cooling fan "so as to be rotated reversely for a preset period of time at every times (sic) when a predetermined period of time has elapsed after starting refrigerating operation." Such a statement fails to teach or disclose the invention as set forth in claims 6-8. More specifically, JP'768 does not teach a reversing motor drive system that is powered directly off terminals associated with the compressor, thereby providing power to the motor drive system during the normal operating mode of the compressor, as required in claim 6. The reference also does not teach the control means of claim 7 which includes a timer for monitoring and accumulating data representative of compressor running time during the refrigeration cooling cycle. Nor does the reference teach or disclose the cleaning system of claim 8 having the specified periods of operation and speeds set forth therein. Accordingly, claims 6-8 are believed to be allowable over JP'768 as well.

Shell and Buchanan are cited by the Examiner as "each, separately, teach[ing] connecting the reversing portion of the circuit across the compressor contacts so that the timing portion of their respective disclosure only operate when the compressor is

running." Applicant disagrees with the Examiner with respect to both Shell and Buchanan. In Shell, fan speed reversal is used to clean a condenser in a refrigerating unit. Forward and reverse speeds are the same since an ac induction motor drives the fan. Fan motor reversal is accomplished by a capacitor 24 in the start winding circuit, which is switched in or out when the compressor motor is switched off or on. Thus, Shell discloses a straightforward air flow reversal system. No airflow reversal cycle time variation is taught or suggested. In examining Figs. 1- 3, it appears that the fan motor is continually operated in Shell. A continuous current path is provided to the fan motor field windings regardless of whether the compressor motor is on or off, with the circuit path being modified by the capacitor 24 in order to reverse the fan motor direction.

Such an arrangement clearly does not teach or suggest the claimed invention. More specifically, Shell fails to teach or disclose a reversing motor drive system that is powered directly off terminals associated with the compressor, thereby providing power to the motor drive system during the normal operating mode of the compressor, as required in claim 6. The reference also does not teach the control means of claim 7 that includes a timer for monitoring and accumulating data representative of compressor running time during the refrigeration cooling cycle. Nor does the reference teach or disclose the cleaning system of claim 8 having the specified periods of operation and speeds set forth therein. Accordingly, claims 6-8 are believed to be patentable over Shell.

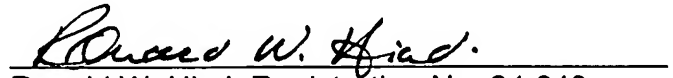
In Buchanan, two embodiments for airflow reversal for condenser cleaning purposes are disclosed. In the electrical system, airflow reversal occurs when the current in the start winding is reversed, and each time the compressor motor is switched on or off, a reversal (switch 23) occurs. In the mechanical system, rather than switching the start winding current, movable louvers are provided. The same cam mechanism is used in both systems. No timer or control means such as that required in claims 1 and 7 is taught or disclosed by Buchanan. Moreover, the reference does not teach or disclose the cleaning system of claim 8 having the specified periods of operation and speeds set forth therein. Accordingly, the claimed invention is believed to be patentable over Buchanan.

Claims 9-12 and 17 are rejected under 35 USC §103(a) as being unpatentable over the prior art as applied to claims 1, 7 and 16 and further in view of Uemura and Brallsford. Uemura and Brallsford disclose solid state commutated motors. Applicant believes the Examiner's reference to Uemura and Brallsford is misplaced and not relevant to the claimed invention. Uemura and Brallsford refer solely to changes and enhancements in the technology of electronically commutated dc motors. The Examiner states "both Uemura and Brallsford teach SSC motors which would have been obvious to have used in the prior art to avoid having to replace brushes in a commutated type motor." However, SSC motor technology is not driven by reliability problems associated with commutator/brush current conduction, as suggested by the

Examiner. Instead, SSC motors are required in amended claims 9-12 and 17 because such motors provide precise speed and torque control under differing load conditions of the present invention. There is no basis in the art cited by the Examiner for combining or modifying Van Gils or the other cooling system references to include the SSC motor of the present invention. No cooling system reference teaches or discloses any advantage to operating the cooling fan in the reverse mode at a higher speed than in the forward mode. Absent such a showing in the prior art, the examiner has impermissibly used the applicant's teaching to hunt through the prior art for the claimed elements and combine them as claimed. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed.Cir. 1990). Accordingly, Applicant believes claims 9-12 and 17 are patentable over Uemura and Brallsford.

In view of the foregoing, Applicant believes claims 1-12, 16, 17, and 20-28 are in condition for allowance. Issuance of a Notice of Allowability is respectfully requested.

Respectfully submitted,



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